Therapy control in a patient with an inflammatory abdominal aneurysm: potential pitfalls in PET/CT imaging

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Therapy Control in a Patient With an Inflammatory Abdominal Aneurysm

Potential Pitfalls in PET/CT Imaging

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Abstract: We present a case of inflammatory abdominal arterial aneurysms, which demonstrates the potential usefulness of PET/CT with ^{18}F-FDG in long-term monitoring of this disease, but also demonstrates potential pitfalls in abdominal arterial aneurysm imaging with PET/CT. Imaging may be challenged as the initial presentation prior to therapy may mimic an infected aneurysm. Follow-up images may be mistaken for vascular graft infection or persistent disease.

Key Words: FDG, inflammatory abdominal aneurysm, PET/CT, therapy control

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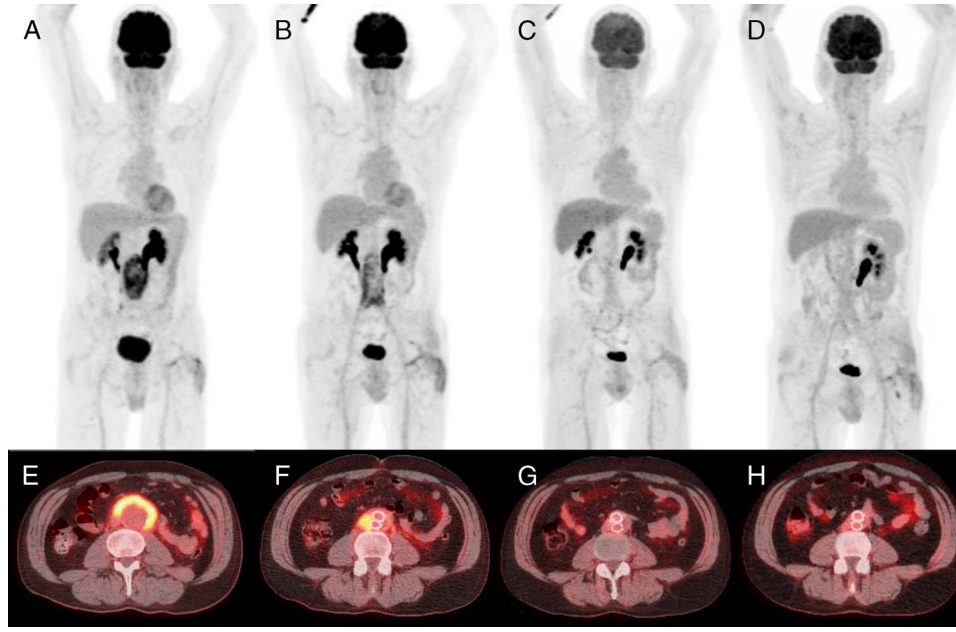

FIGURE 1. Inflammatory abdominal arterial aneurysms (IAA) are characterized by perianeurysmal fibrosis and inflammation and constitute between 3% and 10% of all abdominal aneurysms. Etiology, pathogenesis, patient management, and the duration of anti-inflammatory therapy are discussed controversially in the literature. Positron emission tomography/computed tomography with ^{18}F-fluorodeoxyglucose (PET/CT) has become a promising imaging modality in the field of infection and inflammation, particularly in vascular diseases such as arteritis and vascular graft infections. Images demonstrate the case of a 58-year-old man, who initially presented with back pain and fever. The C-reactive protein was 44 mg/L, and the white blood cell count was 7.4 G/L. His initial PET/CT examination in February 2015 (maximum intensity reconstructions of PET [**A**] and fused PET/CT images [**E**]) showed intensely increased FDG uptake in the wall of an abdominal aortic aneurysm (SUVmax 9.0). This finding was rated suggestive of an infected arterial aneurysm by 2 experienced PET/CT readers; however, the final diagnosis was an immunoglobulin G4–associated inflammatory abdominal aneurysm (Ormond disease). At first PET/CT follow-up after endovascular repair in September 2015 (**B** and **F**), the patient was under ongoing steroid treatment and no antibiotic treatment; the C-reactive protein had decreased to 25 mg/L, and the white blood cell count was 7.6 G/L. An intense focal FDG uptake (SUVmax 7.2) was detected adjacent to the graft, which fulfilled all imaging criteria for a vascular graft infection.[1] Consecutive follow-up PET/CT in March 2016 and December 2017 showed very faintly increased FDG uptake (**C**, **D**, **G**, and **H**), slightly higher than background activity in the mediastinal blood, but lower than background activity in the liver. This is in line with previous reports on therapy control in vascular graft infection, describing faint residual metabolic activity adjacent to the graft, even after successful antibiotic treatment.[2] At the last clinical follow-up in December 2017, the patient was in good clinical condition, treated with low-dose prednisone (5 mg/d), and showed no sign of infection. This case report documents that IAA may present with high metabolic activity in PET/CT, comparable to infected aneurysms[3,4] or vascular graft infections.[1,2,5–8] Previous reports on vascular graft infections have shown that the metabolic activity typically decreases with antibiotic treatment.[2,9–14] However, metabolic activity may remain above background level even after successful treatment.[2] Similarly, in patients with IAA, therapy control with PET/CT may potentially mimic persistent disease.